Data Coding.

Let x represent the observation of a sample data and let $y = ax + b$, where $a \neq 0$. Then

(1) $\text{Mean}(y) = a\,\text{Mean}(x) + b$. That is, $\bar{y} = a\bar{x} + b$.

(2) $\text{Median}(y) = a\,\text{Median}(x) + b$.

(3) $\text{Var}(y) = a^2\,\text{Var}(x)$. That is, S^2 of $y = a^2 (S^2$ of $x)$.

(4) $\text{Std.}(y) = |a|\,\text{Std.}(x)$. That is, S of $y = |a|(S$ of $x)$.

(5) $\text{Range}(y) = |a|\,\text{Range}(x)$.

(6) $\text{IQR}(y) = |a|\,\text{IQR}(x)$.

(7) P_{100p} of $y = \begin{cases} a(P_{100p} \text{ of } x) + b, & \text{if } a > 0, \\ a(P_{(100-100p)} \text{ of } x) + b, & \text{if } a < 0. \end{cases}$

Ex: Let x represent the observation of a sample data.

Assume that $\bar{x} = 20$,

S of $x = 6$,

Q_1 of $x = 12$,

Q_3 of $x = 22$,

P_{20} of $x = 10$,

P_{80} of $x = 30$.

Let also $y = 1 - 2x$.

Find (1) $\bar{y}$. (3) Q_1 of y.

(2) S^2 of y. (4) P_{20} of y.

Soln. (1) $\bar{y} = 1 - 2\bar{x} = 1 - 2(20) = -39$.

(2) S^2 of $y = (2)^2$ (S^2 of x)

$= 4(6)^2$

$= 144$.

(3) Q_1 of $y = 1 - 2$ (Q_3 of x) ; as $a = -2 < 0$.

$= 1 - 2(22)$

$= -43$.

(4) P_{20} of $y = 1 - 2$ (P_{80} of y)

$= 1 - 2(30)$

$= 59$.

(5) Find P_{80} of y.
(6) Find Q_3 of y. } Exc.

Searching keywords:

- Coding data, scaling data.
- The University of Jordan الجامعة الأردنية
- Principles of Statistics مبادئ الإحصاء
- Baha Alzalg بهاء الزالق

References: See the course website. http://sites.ju.edu.jo/sites/Alzalg/Pages/131.aspx

For any comments or concerns, please use my email to contact me.

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